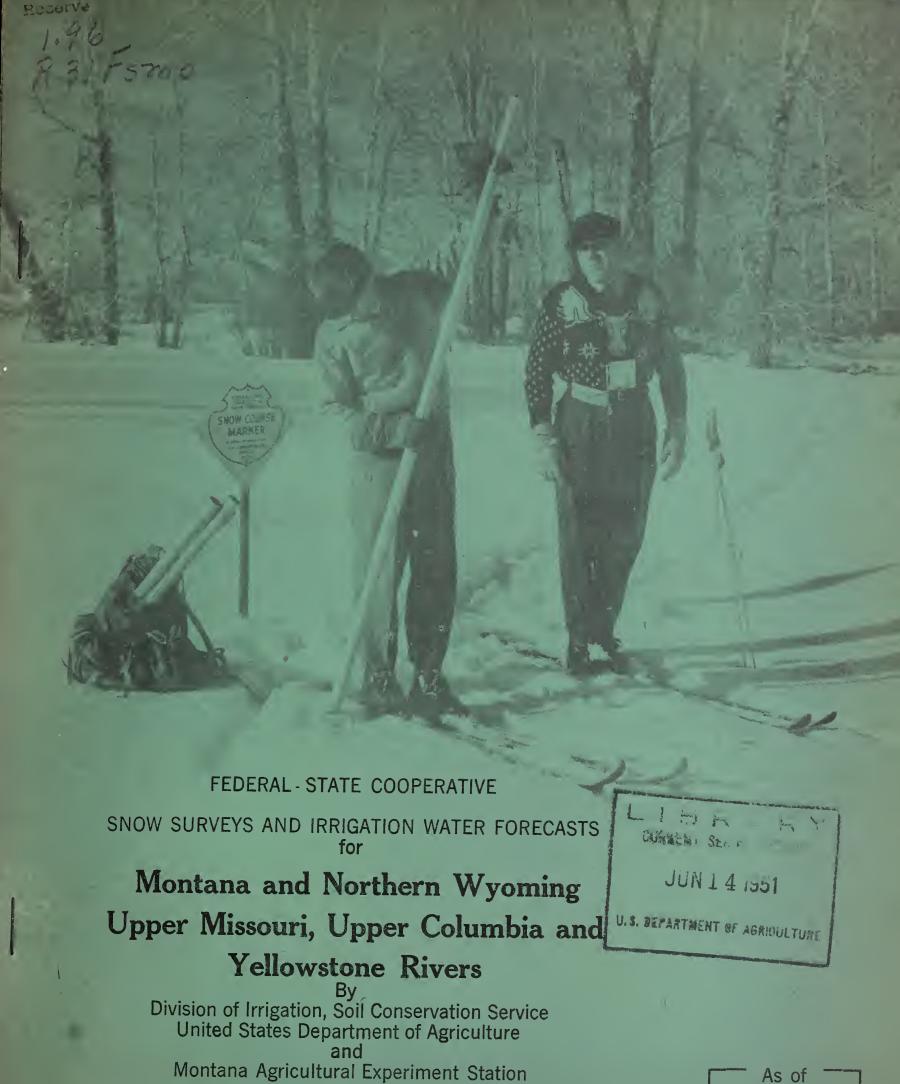
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In cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, U. S. Bureau of Reclamation, State Engineers of Montana and Wyoming and other Federal, State and local organizations.

As of

MAY 1, 1951



FEDERAL-STATE COOPERATIVE SNOW SURVEYS

AND

IRRIGATION WATER FORECASTS

FOR

MONTANA and NORTHERN WYOMING

Upper Missouri and Upper Columbia River
Basins

Report Prepared by

Ashton R. Codd: Hydraulic Engineer Soil Conservation Service

and

O. W. Monson: Irrigation Engineer
Montana Agricultural Experiment Station

Division of Irrigation Soil Conservation Service

and

Montana Agricultural Experiment Station Bozeman, Montana



IRRIGATION WATER SUPPLY OUTLOOK MAY 1, 1951

May I snow surveys on the headwaters of the Columbia and Missouri Rivers in Montana indicate an ample supply for irrigation on those streams with reservoir control. Other streams may run short during the latter part of the season.

Similar conditions prevail in Northern Wyoming in the Big Horn, Shoshone and Wind River drainage basins.

Storage reservoirs, filled to capacity are assured by the end of the snowmelt season.

Stream flow has generally been above average since October.

Valley precipitation has been above average west of the continental divide in Montana; but east of the divide extending into eastern Montana and Northern Wyoming, precipitation has been below average and is seriously effecting those areas depending upon precipitation for wheat and other dry farming crops.

The seasonal forecast of various streams are tabulated on the following page.



MAY 1, 1951
PRELIMINARY ESTIMATES OF RUNOFF OF REPRESENTATIVE
STREAM GAGE STATIONS IN MONTANA AND NORTHERN WYOMING

NAME OF STREAM AND STATION	May-June	July-Aug Sept.	. May-Sept.	Percent Average
MISSOURI BASIN	FO	RECAST IN A	CRE FEET	
Gallatin River at Gateway Gallatin River at Logan Madison River at West Yellowstone Hyalite Creek at Ranger Station No. Fk. Musselshell at Delphine Judith River near Utica Yellowstone River at Corwin Springs Big Hole River at Melrose Missouri River at Fort Benton	267,600 256,000 101,000 20,400 1,400 22,570 1,050,000 567,200 2,025,000	192,400 180,000 76,000 11,200 1,000 8,600 720,000 223,400 1,050,000	460,000 455,000 177,000 31,600 2,400 30,580 1,770,000 790,600 3,075,000	123 110 116 102 109 82 107 138 110
LOWER YELLOWSTONE RIVER (WYOMING) No. Fk. Popo Agie River near Lander Wind River at Riverton Shoshone River below Buffalo Bill Middle Fork Powder near Kaycee Tongue River near Dayton Tongue River at Acme Goose Creek near Sheridan UPPER COLUMBIA RIVER BASIN	April-June 47,500 352,300 574,800 66,430 92,250 234,000 48,210		April-Sept. 60,960 670,000 1,037,000 75,150 119,580 285,000 58,470	111 140 130 102 98 115 85
Bitterroot River at Darby Clark Fork above Missoula Clark Fork below Missoula Clark Fork at St. Regis Flathead River at Columbia Falls Flathead River at Polson Clark Fork River at Plains Clark Fork River at Heron	422,000 1,600,000 2,700,000 3,520,000 6,100,000 6,200,000 8,700,000		520,000 1,720,000 3,140,000 4,150,000 7,200,000 7,800,000 12,300,000 14,100,000	125 134 132 125 157 153 147 139

Note: Probable Error for these forecast is plus or minus 10 to 15% of the forecast value. Values of (r) range from 0.720 to 0.983.



The Beaverhead River above Dillon will flow a little below average this season. Below Dillon, to Sappington, it is anticipated that the flow will be above average and probably greater than last season.

The Madison River into Hebegen Reservoir should flow approximately 177,000 acre feet from May through September, or 16 percent above average. This flow should be ample to bring the reservoir to capacity by the end of the Snow Melt Season.

The Gallatin River at Gateway will flow about 460,000 acre feet during the May-September season with about two-thirds of this volume coming by the end of June, which will leave the usual August-September shortage due to the lack of storage facilities for peak flows.

The Missouri River Main Stem from Three Forks to Fort Benton should flow slightly above average. The average flow, May through September, being 2,796,000 acre feet. The forecast is for 3,075,000 acre feet.

The Sun, Teton, and Marias Rivers should flow very close to normal for the irrigation season.

The Upper Yellowstone River at Corwin Springs, below Gardiner, will flow about 7% above average during the May-September season, or close to 1,770,000 acre feet; the average for this period being 1,665,000 acre feet.

Snow measurements on the Wind River above Riverton, Wyoming, indicate an abundant water supply from that basin this season. The forecast for this river at Riverton is 670,000 acre feet for the period April-September, or 140 percent above. Heavy rains would augment this flow considerably. Warm temperature, followed by excessive rain, could cause considerable damage from extremely high flows.

The snow cover on the Pop Agie River Basin is not as high in proportion to the average as the Wind River. This river should flow about ten percent above average. A good supply of water is anticipated for this season.

On the Shoshone River, below Buffalo Bill Reservoir, the flow for April-September will be approximately 1,037,000, or 140 percent of average for that period. This volume should assure ample water for irrigation and power demands during the season.



The Tongue and Powder Rivers in Wyoming will flow approximately normal during the season and should produce more water than last season. Snow surveys last season were low, about 60% of normal. This year, the water content in the snow indicates about 100 to 115% of average which should produce a good water supply this season.

UPPER COLUMBIA RIVER WATER SUPPLY OUTLOOK

May I snow survey on the upper Kootenai indicates a water supply of 10 to 30 percent above average. The snow pack is not as heavy as last season, which averages close to 150% of normal.

May I water content measurements made on the Flathead River Basin have increased slightly during the month of April. It is anticipated that the water supply during April-September at Columbia Falls, will be approximately 7,200,000 acre feet, with about 6,100,000 passing Columbia Falls during April and June.

May I measurements in the entire Columbia River Basin were hampered by a large storm which occurred on April 29-30, which added materially to the snow pack in the high elevations but would disappear very rapidly in the lower regions of the river basin.

The Upper Clark Fork River Basin was effected by this April 29-30 storm and has increased the percentage figures in low elevations out of proportion. It is believed that the April water content measurements will be more in line with perspective flows than are the May measurements. For the reason stated above, the forecast issued on April 1 are still being used as the May 1 forecast.

* * * * * *



				T a cotà a	. m				Location	
Drainage Bysin ani Course Name Ubs FERS N RUYER (RUSK-DRAVERSEAD)	Contana Cumb er	Elev.	Sec. Lat.	Dwr. River	Rai.je	Record Fegan	Measurin Dates ^a	Neasured Eys	Drainage Basin Montana Sec. Range Record Measuring and Course Name Mumber Elev. Lat. Twp. Long. Began Dates Missouri River Drainage (Cont.)	Measured By:b
Laneview Ridge Laneview Canyon Limekiln White Pine Ridge (MUKOE PRAIRIE)	11E3 11EL 11E2 11E1	7L00 0930 0950 6550	27 20 15 16	14s 14s 5s 14s	2'N 9'N 9'N	19LS 1943 1943 1945	3,-,5 3,4 3,4	9 9 1 1	Beavers :ill 9F8 6900 6 L3N 102W 19L8 2,3,L,5 Owl Creek 6F1 6700 30 L3N 101W 19L8 2,3,L,5 Iensleep R.S. 7E3 6300 30 L9N 80W 1935 L,5 Imber Creek 9E2 8600 25 L7N 103W 19L8 L,5 Ranger Creek 7E1 6800 32 53N 86W 1935 L,5	Pd.Obs. Pd.Obs. 1 1
lloway Dick Gold Stone Lemni Pass Ferrall Creek	13D10 13D9 13E1 13D12	7000 8100 7450 9050	12 11 9 14 15	8s 8s 10s 9s 10s	10W 10W 15W 15W 15W	1948 1948 1945 1948 1948	3,4 3,4 3,4 3,4	1 1 1 1	(ShOShORE RITER) WYO. East Entrance 10Eo 7000 17 52N 109W 19L8 1,2,3,1,5 Sylvan Pass 10E5 7100 12 52N 110W 1936 1,2,3,1,5	1 5 5
.rull Creek 3-1wa; Junction (FIG MOLL)	13E2 13D11	7090 600	27	8S	15W	1948	3 <u>1</u> ; 3 <u>1</u> 4	1	TONGUE RIVER WYO. Bis Goose 7E2 7700 4 53N 86W 1935 4,5 POWDER RIVER WYO.	1
Big Hole Pass Big Hole Pass(Below Bast Boundary	1303 w)1304 1305	71:1:0 0900 0700	28 24 22	3S 3S 3S	18W 18W 17W	19L3 19L8 19L8	3, <u>1</u> , 3, <u>1</u> , 3, <u>1</u> ,	1 1 1	Red Fork 7E1 7000 18 L3N 85W 1936 L,5 Sour Dough 6E1 8500 17 L9N 8LW 1936 L,5	Pd.Obs.
Gibbons Pass Jahnke Creek Miner Forks Miner Lake	1302 1308 1306 1307	7100 7310 7300 6720	25 24 10	2s 7s 6s	19W 16W 17W 16W	1934 1948 1948 1945	2,3,4,5 3,4 3,4 3,4,5	1,2 1 1	KOOIFMAI RIVER Columbia River Basin	
(WISE RIVER) Anderson Mdw. Flk Horn Wise River	13D14 13D15 13D13	7000 8450 6300	18 15 15	3s Ls 2s	12W 12W 12W	1948 1934 1948	3,4 3,4,5 3,4	1 2 1	Baree Mountain 15B1 6000 1 25N 31W 1937 4,5 Brush Creek 1\(\hat{h}\tau\) 5000 13 30N 18W 19\(\hat{h}\tau\) 3,\(\hat{h}\tau\) Red Mountain 15A1 6000 4 36N 29W 19\(\hat{h}\tau\) 3,\(\hat{h}\tau\)	1 1 1
(RUBY RIVER) Cottonwood Jottonwood (Upper) Alasalight Douleco Root	11£2 11£1 12D3 12D2	5900 81,00 950 6900	24 30 22 13	10S 10S 8S 4S	3 W 2 W 7 W 3 W	1948 1948 1945 1948	3,4 3,4 3,4,5 3,4	1 1 1	FLATHEAD RIVER Big Creek 13B3 6750 627 22% 18W 19L1 4,5 Erush Creek 14AL 5000 13 30% 26W 1937 3,4 Cattle Queen 13Al 4700 7 35% 17W 1939 3,4	4 1 5
Vigilante MaDISON RIVER mebgen West Yellowstone	1151 11E5 11E7	6125 6550 6700	28 22 34	9S 11S 13S	3W 3E 5E	1948 1934 1934	1,2,3,4,5 1,2,3,4,5	1 2 2	Desert Mountain 13A2 5600 2L 31N 19W 1937 1,2,3,4,5 Elk Mountain 13BL 6750 1 20N 19W 19L1 3,4 Goat Mountain 12B7 7000 20 22N 10W 193L 3,4 Hell Roaring Divide 1LA3 5770 35 32N 22W 19L2 L,5 Kishenehn 1LA2 L300 7 37N 21W 19L6 L,5	1 4 2 1
Norris Basin JALLATIN RIVER Devil's Slide Hood Meadow	10E2 10DL 10D3	7500 8100 9600	14 22	5s 4s	6E 6E	1935 1935 1934	3,4,5 3,4,5	5,6 2,6 2,0	Limestone Pass 1388 7000 34 17N 15W 1948 3,4 Logan Creek 14A5 4300 34 30N 24W 1937 3,4 Marias Pass 13A5 5250 34 30N 14W 1934 1,2,3,4,5 North Fork Jocko 1387 6330 3 17N 17W 1944 3,4	1 1 2 4
Mystic Lake New World 21-Mile ISSOURI RIVER MAI	10D2 10D1 11E6	6000 0700 7150	30 24 1	3S 3S 11S	7E oe 5E	1935 1939 1934	2,3,4 2,3,4,5 1,2,3,4,5	6,7 0,7 2	Rainy Lake 13B6 1300 11 18N 16W 1917 3,1,5 Snow Lab. # 16 13A9 5200 15 29N 11W 1916 1,2,3,1,5 Spotted Bear Mt. 13B2 7000 23 25N 15W 1918 3,1 Strawberry Lake 13B10 6500 11 28N 19W 1918 3,1 Trinkus Lake 13B1 6500 9 25N 17W 1918 3,1	1 2 1 1
Chessman Reservoir Crystal Lake Brasshopper Kings Hill	901 1002 1001	6200 6100 7000 7950	2 2L 19 35	8N 12N 9N 13N	5 W 17E 8E 7E	1936 1941 1938 1937	1,2,3,4,5 3,4 3,4,5	2 1 1 2	Trout Lake 17811 3600 21 28N 17W 19L8 3,4 Upper Holland Lake 1385 7000 28 20N 16W 19L8 3,4 UPPER CLARK FORK Chessman Reservoir 1205 6200 2 8N 5W 1936 1,2,3,4,5	1 1 2
Picnic Grounds Pipestone Pass Stemple Pass Tenmile Creek, Lowe Tenmile Creek, Widd Tenmile Creek, Uppe	le1203	0500 7200 0900 6250 0800 8000	22 11 10 13 13	5N 1N 13N 8N 8N 8N	61V 71V 71V 6W 6W 5VV	1940 1938 1934 1935 1934 1935	2,3,4 2,3,4,5 3,4,5 1,2,3,4,5 1,2,3,4,5	3 1 2 2 2 2 2	East Fork Ranger Stn1301 5400 16 2N 17W 1937 4 El Dorado Mine 1309 7800 23 8N 12W 1946 4 Gold Creek Lake 1308 7200 14 8N 12W 1946 4 Intergaard 1304 6450 6 5N 13W 1939 2,3,4 North Fork Jooko 13B7 6330 3 17N 17W 1941 3,4 Picnic Grounds 1206 6500 22 5N 6W 1940 2,3,4	1 11 11 3 4
(TEFON RIVER) Fright Creek Waldron Creek West Fork (SUN RIVER)	12A1 12B2 12B1	6000 5000 6000	13 10 6	26 N 25 N 25 N	10W 9W 9W	1948 1948 1948	3,4 3,4 3,4	1 1 1	Pipestone Pass 12D1 7200 11 1N 7W 1938 2,3,4,5 Rainy Lake 1386 4500 11 16N 16W 1947 3,4,5 Skalkaho Summit 13C3 7258 30 6N 17W 1937 4 Slide Rock Mountain 13C2 7100 26 10N 16W 1937 4 Southern Croes 13C5 6500 9 5N 13W 1939 2,3,4	1 1 1
Bench Mark Cabin Creek	1238 1230	5500 5400	9 33	20N 23N	10W 10W	19L8 19L9	3.4 3.4	1	Stemple Pass 1301 6900 16 13N 7W 1934 3,4,5 Storm Lake No. 2 1207 7780 19 LN 13W 1939 4 Stuart Mill 1306 6500 19 5N 13W 1939 2,3,4	3 2 1 3
5-Bull Gates Park Soat Mountain My Lake Wrong Creek Ridge Wrong Creek	1289 1285 1287 1389 1283 1284	5600 5300 7000 7300 6800 5700	30 31 20 21 17 32	20N 2LN 22N 23N 25N 25N	10W 10W 10W 12W 10W 10W	1948 1949 1934 1950 1949 1949	3.4 3.4 3.4 3.4 3.4 3.4	1 1 2 1 1	Stuart Mountain #1 1301 7100 6 11N 18W 1936 L Tenmile Creek, Lower 1202 6250 13 8N 6W 1935 1,2,3,1,5 Tenmile Creek, Middle1203 6800 13 8N 6W 1935 1,2,3,1,5 Tenmile Creek, Upper 1204 8000 19 8N 5W 1935 1,2,3,1,5 PEND OREILLE RIVER	1 2 2 2
(MARIAS RIVER) Marias Pass Snow Lab. #10	13 A 5 13 A 9	5250 5200	34 15	30N 29N	11,w 11,w	1936 1947	1,2,3,4,5	2	Baree Mountain 13B1 6000 1 25N 31W 1937 L,5 Freezeout Summit 15C3 7000 21 15N 27W 1937 L Hoodoo Creek 13C1 6200 9k16 1LN 27W 1937 L	1 1 1
(MILK RIVER) Rocky Boy	9 A l	5200	15	28N	loE	1941	3,4	7	BITTERROOT RIVER East Fork R. S. 13D1 5L00 10 2N 17W 1937 4	1
(MUSSELSHELL RIVE Grasshopper	R) 1003	7000	19	9N	8 E	1938	3,4	1	Gibbons Pass 13D2 7100 4 28 19W 1;34 2,3,4,5 Mud Creek Pasture 14C1 4500 24 11N 24W 1937 3 Nezperce Camp 14D2 5580 19%20 18 23W 1937 4	1 1 1
UPPER YELLOWSTONE Camp Senia Canyon	9D1 10E3	7890 7 750	2 네^-네.	8 S	18E 10°-30'	193 <i>7</i> 1938	4	1 Pd.Obs.	Nezperce Pase 1LD1 6575 32 28N 16E 1937 4 Skalkaho Summit 13C3 7259 30 6N 17W 1937 4 Stuart Mountain #1 13C1 7L00 6 1LN 18W 1936 4	1 1 1
Cooke City Crevice Mt. Independence	10D7 10D5 10D0	7400 8400 8000	25 29 22	98 9 8 78	14E 9E 12E	1937 1935 1941	1,2,3,4,5 3,4 3,4	5 1 Pd.Obs.	ST. MARY RIVER Seskatchevan River Basin	
Lake Camp Lodgepole (Wyo.) Lupine Creek (SHILLDS RIVER)	10E4 9E1 10E1	7850 8200	144°-34° 32 144°-54°	56N	10°-24' 106W 10°-37'	1937 1940 1938	1,2,3,4,5 4,5 1,2,3,4,5	Pd.Obe. 1 5	Iceberg Lake	2,8 2,8 2,8 2,8 2,8
Porcupine LOALK YELLONSTONE	1003	6500	10	ĻN	10E	1938	3,4	1	a. Numerale 1,2,3,4, and 5 refer to January 1, February 1, March 1, April 1, and	
(WIND RIVER) WYO. Brooks Lake #3 Burroughs Creek	10F2 9F6	9200 8800	23 15	lilin Lilin	110₩ 10 7₩	1939 1948	2,3,4,5	Pd.Obe.	b. Numerals refer to Agency that secures the snow survey as follows:	a ray 1.
Dinwoodie Dry Creek DuNoir	9F10 9F9 9F2	10000 9500 8750	9 34 27	38n Lin Li2n	105W 105W 108W	1948 1948 1 940	2,3,4,5 2,3,4,5 2,3,4,5	Pd.Obs. Pd.Obs. Pd.Obs.	1. U. S. Forest Service 2. U. S. Geological Survey and U. S. Engineer Corpe	
Geyser Creek Hobbs Park Little Warm	9F3 9G2 9F4	8500 10000 9500	12 22 24	LIN 2S	108W 3W 108W	1948 1948 1948	2,3,4,5 2,3,4,5 2,3,4,5	Pd.Obs. Pd.Obs. Pd.Obs.	3. Montana Power Company 4. U. S. Indian Service 5. National Park Service	
Mosquito Park R.S. Sheridan R. S. St.Lawrence R.S.		9500 7500 9000	23 3 26	2S 42N 1N	3W 109W LW	1940 1939 1940	2,3,4,5 2,3,4,5 2,3,4,5	Pd.Obs.	6. Montana Experiment Station 7. City of Boleman 8. Dominion Water and Power Eureau	
T-Cross Ranch Trout Creek Togwotoe Pass (FOTO AGIE RIVER)	9F5 9G1 10F1	8000 8400 9600	1 5 29	73 H	107W 2W 110W	1940 1940 1948 1936	2,3,4,5 2,3,4,5 2,3,4,5	Pd.Obs. Pd.Obs. 10	9. U. S. Fish and Wildlife Service 10. U. S. Eureau of Reclamation 11. Decriodge Citizens Committee Pd. Obs. Paid Observer by Soil Conservation Service	
Blue Ridge	892	9500	23	31N	101₩	1939	2,3,4,5	1		

Blue Ridge Grannier Weadows Larsen Creek Sawnill Glade South Pass 8G2 8G4 9G4 8G1 8G3

31n 30n 30n 31n 30n 101W 100W 103W 101W

2,3,4,5 2,3,4,5 3,4,5 2,3,4,5 2,3,4,5

SUPPLEMENTAL INDEX LIST OF SNOW SURVEY COURSES IN ADJACENT BASINS, USED IN THIS REPORT AND SHOWN ON THE INDEX MAP

DRAINAGE AND SNOW COURSE	Adj. State	Montana Number	Elev. Feet	Section Lat.	Twp	Range Long.	Record Began	Measurement Dates	Meas- ured By
JEFFERSON	Idaho								
Kilgore	.10	11212	6200	6	12N	39 E	1937	1,2,3,4,5	pd.obs.
Blue Ridge Mine		11211	6700	27	13N	38 E	1938	4	pd.obs.
Camp Creek	6	12E3	6800	21	13N	3 6E	1936	1,2,3,4	1
Moose Creek	8	13016	6200	22-27	27N	21E	1937	3,4,5	1
Big Springs	3	11 E 9	6500	34	19N	44E	1936	1,2,3,4,5	10
Island Park	9	11210	3600	28	13N	43E	1936	1,2,3,4,5	10
Valley View	17	11 E 8	6500	7	15N	44E	1936	1,2,3,4	10
UPPER YELLOWSTO	NE Wyo.								
Lewis Lake Div.		10E9	7900	44-13	11	.0-40	1919	1,2,3,4	10
Aster Creek	2	10E8	7700	44-17		.0=37	1919	1,2,3,4	10
Tom Thumb Summi	t	10E7	7900	44-22		0-35	1949	3,4	10
LOWER YELLOWS TO (Wind River)	NE Wyo.								
Togwotee Pass	12	lofi	9600	29	44N	110W	1936	2 7 1 5	10
Kendall	25	9F12	7900	23	38N	110W	1936	2,3,4,5	
Loomis Park	26	10F4	8500	14	37N	111W	1942	3,4,5	1
Yellow Jacket	14	10F5	6775	33	42N	112W	1936	3,4,5	1
Black Rock	2	10F3	8600	4	44N	111W	1936	3,4,5 2, 4	10
Dutch Joe	23	9G6	8700	32	31N	104W	1936	4,5	
Mulligan Park	24	9G5	8900	17	35N	109W	1936	_	1
morriegn serw	2.3	940	0900	allo f	2014	10011	1900	3,4,5	Ψ.
KOOTENAI	Idaho								
Smith Creek	13	16A1	4800	29	64N	3W	1937	4,5	1
	Canada								
Fernie	10		3500	49-31	13	15=01	1939		
New Fernie	10A		4100						
Gray Creek	34		5100	39-37	13	6-41	1948		
Marble Canyon	32		5000	51-12	13	16-09	1947		
Nelson Creek	19		3050	44-25		17=14	1938		
Sinclair Pass	A8		4500	50-40		15=58	1947		
Sullivan Mine	AOS		5100	49-43		6-01	1945		
Upper Elk River			4400	50-01		4-56	1947		
Kimberly	20		3800	49-41	11	15~59	1945		
UPPER CLARK FOR	K Idaho								
49 Meadows	1	15B10	5000	6	43N	5E	1937	1,2,3,4,5	1
Lookout	10	15B2	5250	4	47N	6E	1921	1,2,3,4,5	1
Above Roland	2	15B7	4350	35	47N	6E	1926	3	12*
Below Roland	3	15B6	3770	34	47N	6E	1926	3	12
Sunset	16	1589	5600	28	49N	5 E	1921	3	12
PEND OREILLE	Idaho								
Mosquite Ridge	9	1644	5110	5	54N	2 E	1937	4,5	1
Freezeout #2		15B10	6800		15N	27W	1951	3,4	1
69				-	,			,	

SUPPLEMENTAL INDEX LIST OF SNOW SURVEY COURSES IN ADJACENT BASINS, USED IN THIS REPORT AND SHOWN ON THE INDEX MAP

DRAINAGE AND SNOW COURSE	Adj. State No.	Montana Number		Section Lat.	Twp	Range Long.	Record Began	Measurement Dates	Meas- ured By
BITTERROOT	Idaho								
Moose Creek	8	13D16	6200	22-27	27N	21N	1937	3,4,5	1
Kit Carson	3	14 D 3	4 700	4	27N	16E	1937	4	1
Savage Pass	7	1404	6000	18	36N	15E	1937	4	1
Powell Pasture	6	15C3	3700	27	27N	14E	1937	4	1
Packers Mdw.	5	14C2	5700	15	38N	15 E	1937	2,3,4,5	1
FLATHEAD Besin Creek Holbrook Trout Lake #2 Twin Creeks Quintenkon TONGUE RIVER		13-B-14 13-B-13 13-A-12 13-B-11 13-A-13	5000 4530 3600 3580 3800	11 18 21 14 11	19N 21N 28N 26N 26N	12W 13W 17W 16W 17W	1951 1951 1951 1951 1951	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1 1
Burgess Ranger	24.0	7-E-4	7900	36	56N	89W	1950	3,4,5	Pd.Obs.
Dome Lake	Juan	7-2-5	8800	11	53N	87W	1950	3,4,5	Pd.Obs.
Donne Dag		, -a, -o	0000	**	OON	0711	1000	0,4,0	14.003.
POWDER RIVER									
Soldier Park		7-E-6	8700	36	51N	85W	1950	3,4,5	Pd.Obs.1
Muddy Pass		7-R-7	9700	11	48N	85W	1950	3,4,5	Pd.Cbs.l
North Powder		7-2-8	8500	⁻ 5	4711	85W	1951	3,4,5	Pd. Obs

^{*}Washington Water Power Company

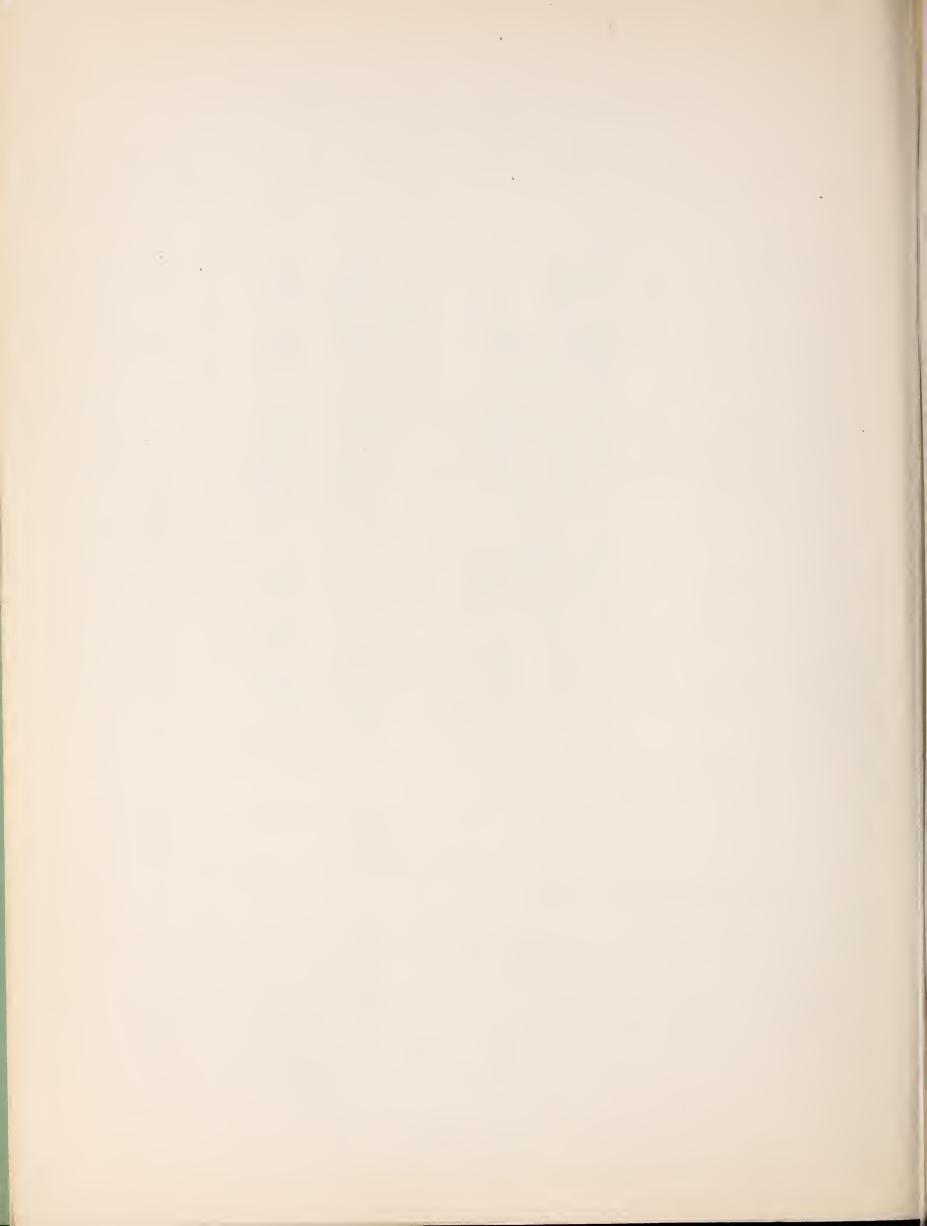
STORAGE IN RESERVOIRS OF MONTANA AND NORTHERN WYOMING Reservoir Volumes in 1,000's of Acre Feet

		Location on or	Usable	Contents	Contents	May 1
	Reservoir	Diversion from	Capacity	This Year	Last Year	10-Year
				May 1	May 1	Average
				1951	1950	1940-49
	Lake Sewall	Missouri	37.8	20.5	12.2	
	Hauser Lake	Missouri	52.1	45.7	34.0	43.9
1	Holter Reservoir	Missouri	81.9	56.5	68.0	53.1
	Fort Peck Res.	Missouri	19,000.0	13,400.0	12,540.0	10,202.0
	Ruby Reservoir	Ruby	38.5			
	Hebgen Reservoir	Madison River	345.0	261.3	231.4	234.4
	Madison Reservoir	Madison River	41.0	29.9	32.8	33.6
	Smith River Res.	Smith River	10.7			
	Gibson Reservoir	N.Fk. Sun River	105.0	81.7	52.5	71.5
	Willow Creek	N.Fk.Sun-Willow Cr.	32.3	27.1	5.9	13.9
	Pishkun Reservoir	N.Fk. Sun River	32.0	19.0	24.7	20.3
	Lower Two Medicine L.	Two Medicine River	14.0	0	0	0 6
	Four Horns Res.	Badger Creek	20.0	8.6	6,3	8.6
	Birch Creek Res.	Birch Creek	30.0	30.2	24.9	25.2
	Lake Francis Res.	Birch Creek	112.0	102.2	91.4	4.3
	Askley Lake Durand Reservoir	Judith River	5.8	•	7.0	40)
	Dead Man Basin	N.Fk. Musselshell	7.0 52.5		1.0	
	Martinsdale Res.	Musselshell River S.Fk. Musselshell	23.1	*	14.6	10,6
	Fresno Reservoir	Milk River	127.2	132.5	60.9	70.5
	Nelson Reservoir	Milk Reservoir	66.8	18.5	13.4	33.3
	Mystic Lake	W. Rosebud Creek	20.8	1.3	0.6	3.4
	Cooney Reservoir	Red Lodge Creek	27.5	16.5	19.0	14.5
	Tongue Reservoir	Tongue River	73.9	1000	15.6	16.5
	Sherburne Lake Res.	Swiftcurrent Creek	66.1	•	34.2	i
	Lake Helena	Missouri River	10.4	7.2	2.7	į
				1		
	YELLOWSTONE RIVER B.	ASIN (Wyoming)		de Constant de Con		
	Buffalo Bill	Shoshone	456.6	236.2	164.3	265.3
	Pilot Butte	Wind River	30.1	1 27082	19.9	21.2
	Bull Lake	Wind River	155.0	 Bitting / management 	6.8	52.6
	COLUMBIA RIVER BASI	N (Montana)		a tr		
	Cooperatorn Toler	Til i ak Om a la	73 0	07.1	70.0	24.1
	Georgetown Lake E.Fk.Rock Cr. Res.	Flint Creek	31.0	21.4	19.0	2401
	717	E. Fk. Rock Creek	16.0	20 ت	3.5	13.3
	Como Lake	W. Fk. Bitterroot Rock Creek	31.7 34.8	20.5	200	رەرىد
	Flathead Lake (Sommers)		1,791.0	990.6	826.9	663.1
	*Little Bitterroot	Little Bitterroot	37.1	36.1	32.6	11.8
	*Dry Fork Reservoirs	Dry Fork Creek	6.7	5.8	6.0	3,9
*	**Mission Valley	Mission Valley	081			
	9 Reservoirs	(Flathead River)	105.0	58.8	35.4	48.9
		,			•	1

^{*}Comprised of two reservoirs on Little Bitterroot River

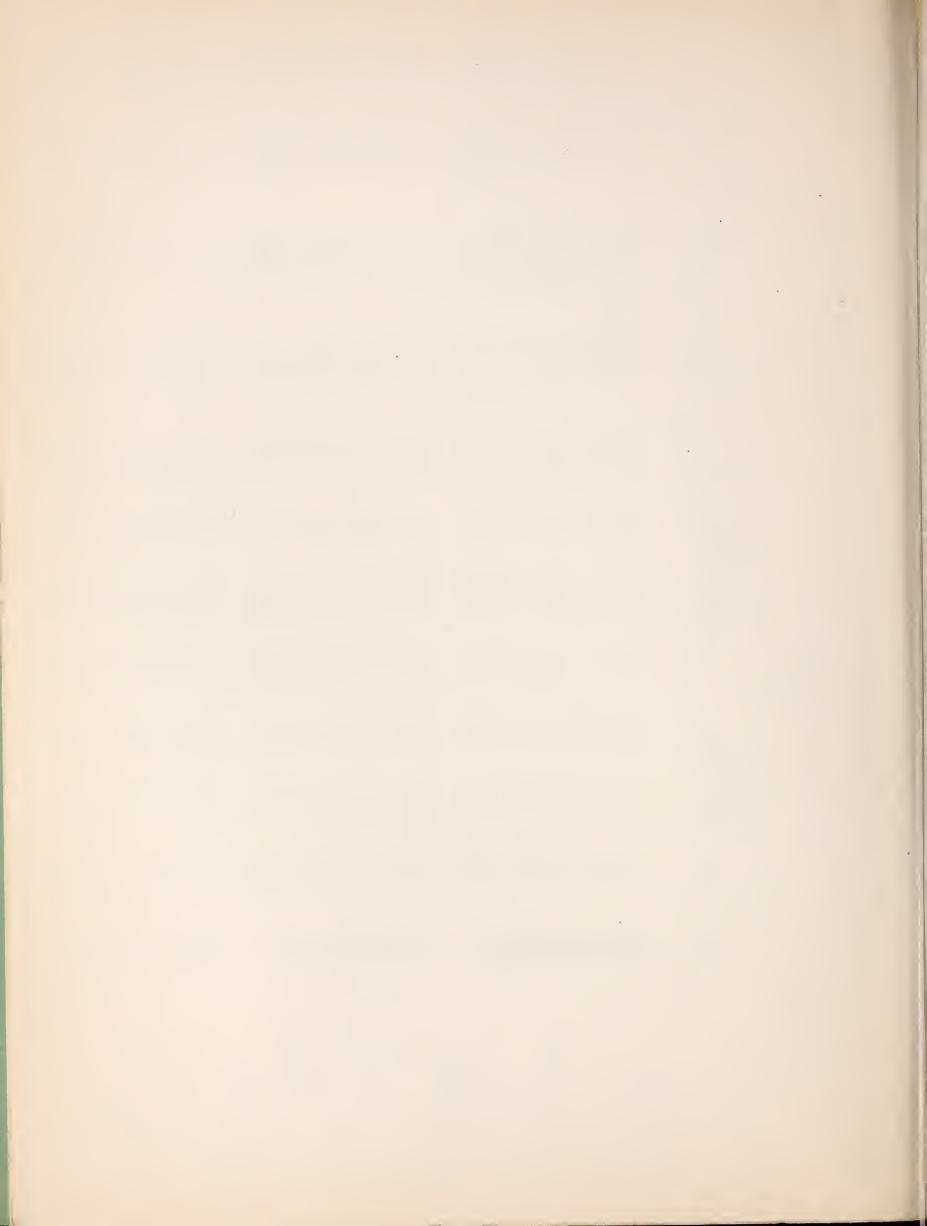
^{*}Comprised of two reservoirs on Dry Fork Creek.

^{**}Comprises nine small reservoirs on Mission Valley Indian Irrigation Service Project.



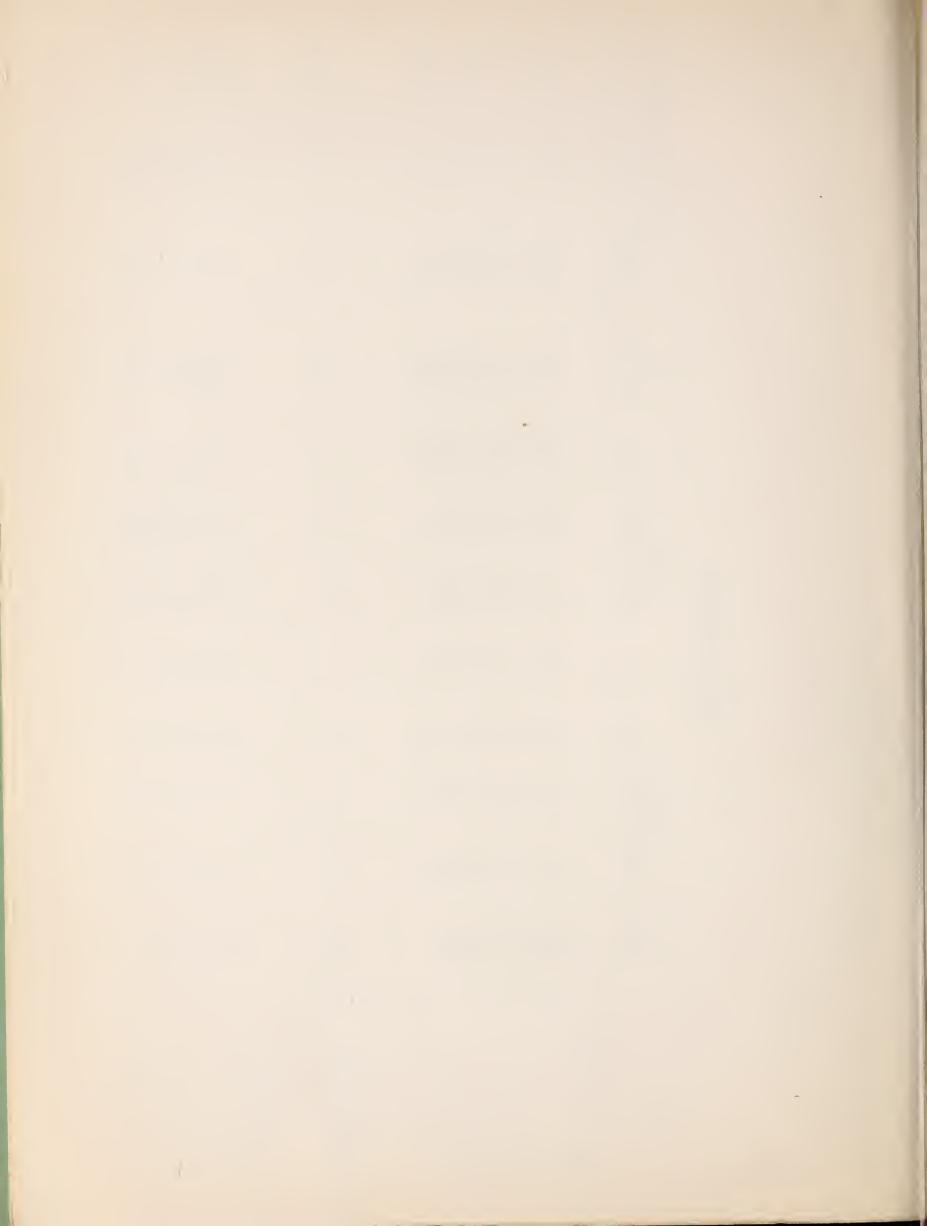
PRECIPITATION DATA FOR MAY 1, 1951 MONTANA

	ļ	5	1950		\$	1.9			Apro	Seas	onal Accumulat	lation
		ايك	ecipitation	ion	اس	cipi	tation		Dept. from	Precipit	ation	
ation Oct.	Octo		Novo	Deco	Jano	Feb。	Mar。	Apro	Normal	50-5	Normal	Departe
						(
5533 5280 0.53	000		1,20	0.59	0.92	0.82	1,85	0.87	0.00	5.94	4.19	4 10 15
inter et annæmer	1.078			0,71	1,21	1.52	. 0	0,36	ိ	, ₇	0	
-	3.46		Θ	1.99	0.97	0.89	9	2,04	°	1,9	٥	2
ew School etc ()	5.87	-	0	5.17	4.77	4.88	Ð	1.67	0	9.9	0	00
owanie i	7.53		0	5,88	5,37	6.52	0	2.97	° ;	တ္စ ထ	0	ည္း
******	7,02	many many or all a strong	0 :	1.63	1, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7,	1,72	0 (1.13	ိ င	ry ac	0, -	0 6
	14.36		9 6	2,25	2.97	30,44	9	1.53	0	8,3	0 0	7
3.118	3.148		0	2.61	2.73	3°08	0	1.42	o	7.5	-	٥
			L.23	0.85	0.65	- °	0	No	0	~ C	0	N F
	0,03		\$ ~	0,00	0.41	300	0 0	- 7V	ه ٥	3 0	0 0	0 0
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0°74	Taguer	<u> </u>	ထွဖ	1,05	0.17	0,-	0	Φ,-	°°	-₹-	0	ဝိဇ
1,06	-Dimenson A	-1.5	$^{\circ}$	0,48	0,38	70	0 0	70	0 0	10	0 0	0 0
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0.86		(0)	2.37	1.03	2,02	0.17	3.50	1.56	1,18	11.56	11.47	+0.09
1			0		1	0	₿	0)	Ì)	•
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1,40	0,24		Ø	0,23	0.48	~ -	0	9	5 F	$\stackrel{\circ}{\sim}$ $\stackrel{\circ}{\sim}$	· C	
2128 0.50			0,18	0,021	0,70	0,40	0,00	1,0 TL	10.40	2,72	7,00	-3.12
139 0.	0.83		0,88	0.68	0.70	, m	0	0	0.6	0 7	20	0,9
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076 0.45	式,	133	30,16	0	0.37	70	0	0	C) r	<u>`</u>	0	, , , , ,
070	ο α		000	0,40	07.0	7)-	6	0 !	1		1/2	
) II) II		10.0	0	1700	0	9	0	0	0	6	0

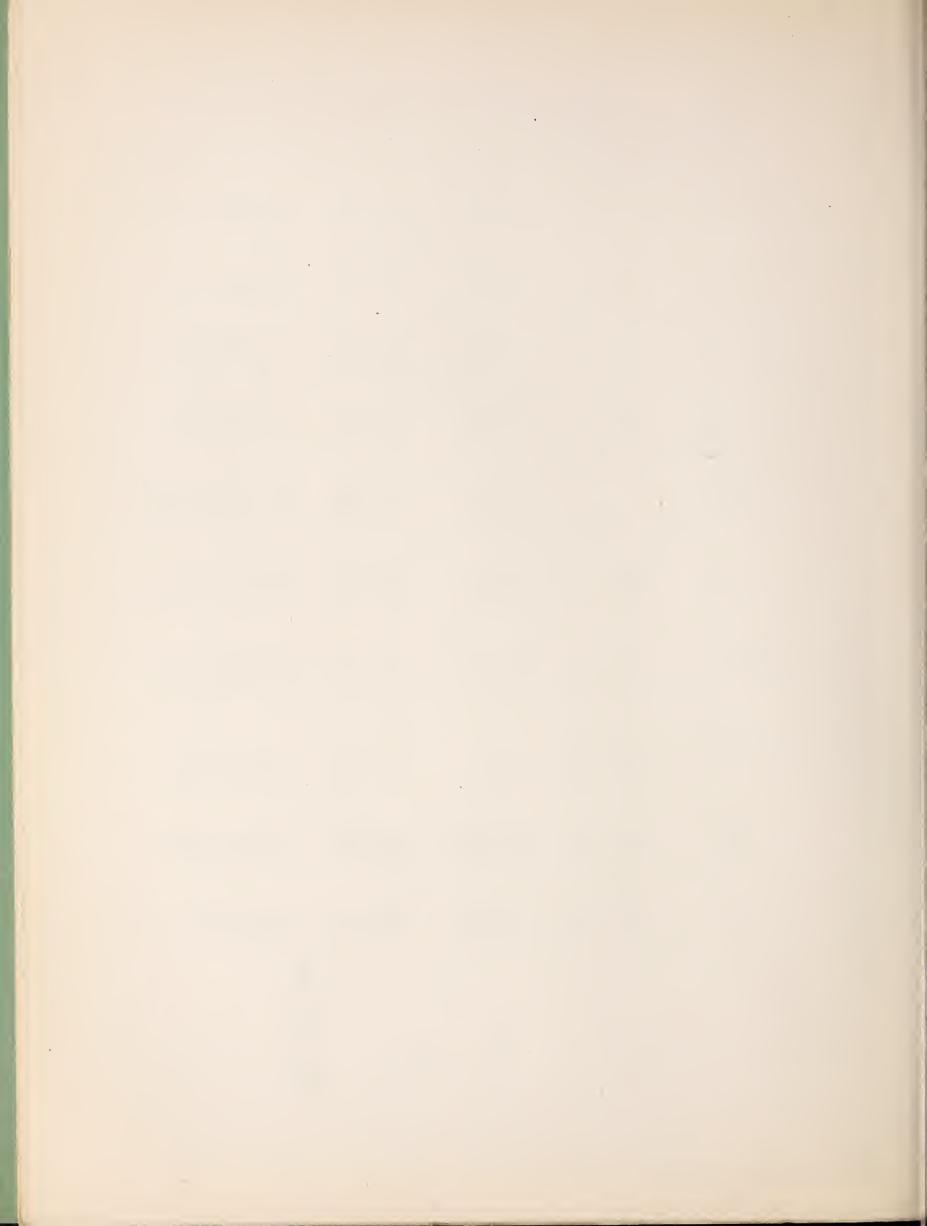


PRECIPITATION DATA FOR MAY 1, 1951 NORTHERN WYOMING

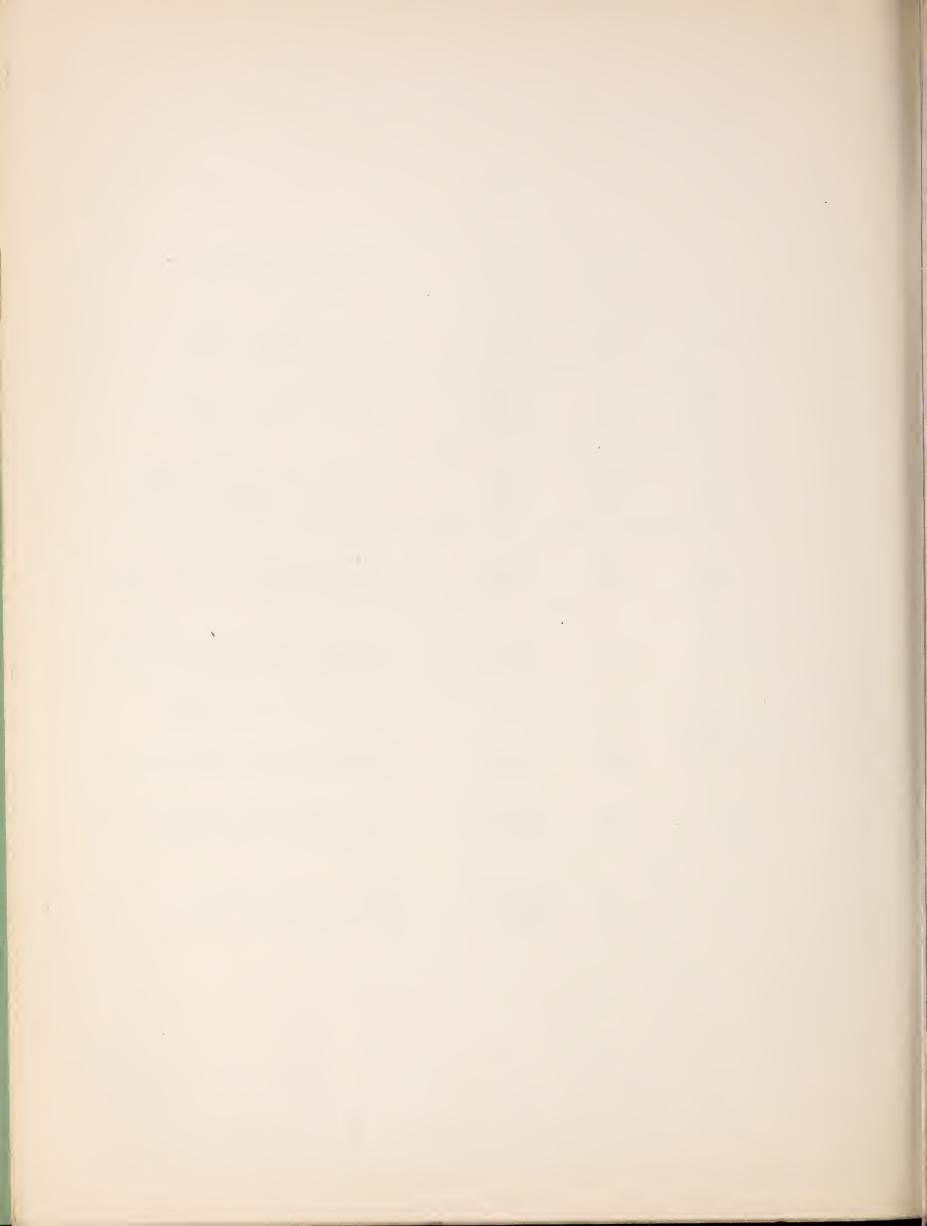
Accumulation		Departure	+ 0.35	- 1°74	- 3,29 - 3,36 - 1,82	- 1.25 - 1.78		— 1.43	2.89 - 1.62 - 2.20 - 2.95
	ation	Normal	3.67	3.5 3.5 3.5 3.5 3.5	7.86 5.97 4.13	4.55		26.93	7.000 2.000
Seasonal	Precipitation	1950-51	4.02	1,61	4,57 2,61 2,31	2.82		5.54	2.01 3.43 3.96 3.33 3.18
Apr.	Dept. from	Normal	- 0.03 + 0.29		- 1.67 - 0.93 - 0.41	10.01		- 0.51	- 1.02 - 0.56 - 1.22 - 1.01
		Apro	1,02	0,65	1.03	0.65	·	1.47	0.27 0.93 0.51 0.80 0.63
	tation	Mar	0.58	0.30	0.29 0.09 0.45	0.80		1.20	0.81 0.43 1.30 0.45 0.45
1951	Precipitation	Feb.	0.09	0,10	0.67 0.18 0.31	0.75		0.24	00.18 00.25 00.25 00.27
		Jan.	.77	E	٠٠٠ 70°	<u>.16</u>		77.	16 20 31 31 31 31
	on	Dec.	.28	070	62°. 00°.	T • 17		.58	06 00 00 00 00 00 00 00 00 00 00 00 00 0
1950	Precipitation	Novo	1.29	10	1.04 .80 .57	.68	anne ann an Aire Aire an Their ann an Aire an	1.05	. 31 . 67 . 40 . 47
	Prec	Oct.	80.00	l H	.19	.37		.51	37.53 53.03.75 53.03.75
	Elev-	ation	1984	1904	6930 14336 14954	2169		1,021	3680 5280 4542 5000 4850
	Station		BIG HORN RIVER BASIN Cody	Worland	Sunshine 4 SW Thermopolis Riverton	Dubois Average (7)		TONGUE RIVER BASIN Sheridan	POWDER RIVER BASIN Arvada Metz Ranch Gillette Nine Mile Creek Mid West Average (5)



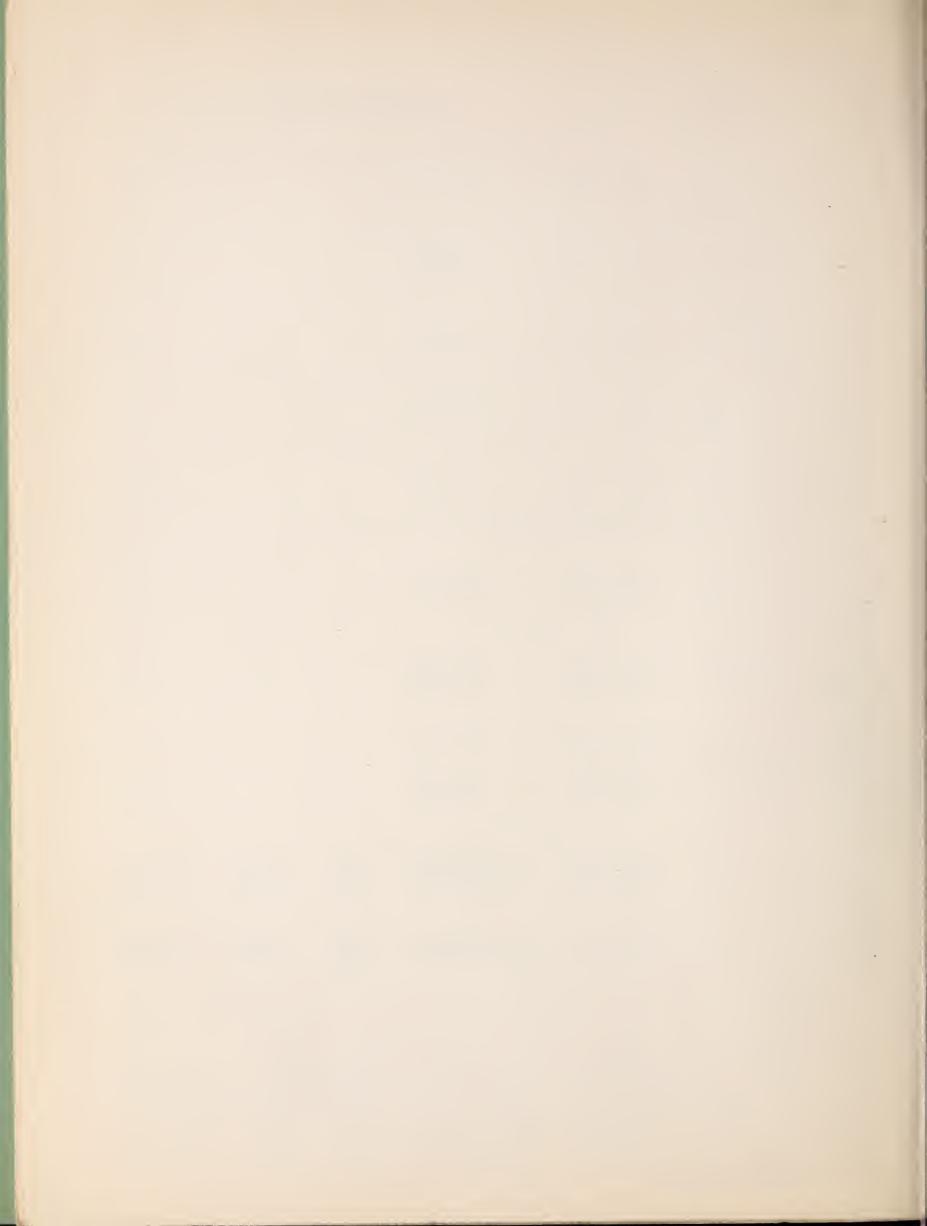
MISSOURI BASIN						a de la destacación de destación de destación de la destación	E CONTRACTOR OF THE CONTRACTOR					
			Date	0	Snow		Water Content	_	(Inches)			
DRAINAGE BASIN AND	No	Elev.	of Survey	e,	Depth (In.)	May 1	Past Records	cords	Average May		Years	Ground Surface
SNOW COURSE **			1951		1951	1951	1950	1949	Avgo	%Avg.	Record	Condition
JEFFERSON RIVER (Rock-Beaverhead) Lakeview Ridge	11E3	00η2	Apr. 2		15,8	1°6	8	2,η	ļ	1	7	
Lakeview Canyon	1111	6930		27	25.5	8.2		2.2	-		2	ue
(Big Hole) Winer Lake	1307	6720	Apre	30	12.2	3.4		80 00	gg G	ļ	2	Froz.
MADISON RIVER Hebgen West Yellowstone 21-Mile Norris Basin	11E5 11E7 10E2	6550 6700 7150 7500	May May	112	Trace 15.3 31.0	Trace 5.1 12.5	8.4 10.0 18.8	1.2	2°.7 3°4 10°2	150	188	Surface Not
GALLATIN RIVER Devil's Slide Hood Meadow New World 21-Mile	1004 1003 1001 11E6	8100 6600 6700 7150	Apr. Apr. Apr. May	29 28 27 2	50°1 17°4 20°2 31°0	18 1 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	24,5 8,5 10,6 18,8	20.3	21.3 4.2 	88 131 	17 17 18	Ground
MISSOURI RIVER MAIN STEM Chessman Reservoir Kings Hill Pipestone Pass Stemple Pass Tenmile, Lower Tenmile, Widdle Tenmile, Upper	1205 1001 1201 1201 1203 1203	6200 7950 7200 6900 6250 8000	May May May May May May	サヤをそってで	114.9 52.8 29.0 144.4 39.2 16.0	3.0 12.8 1.5.1 1.5.1 14.8	7.8 19.6 14.2 16.3	120000000000000000000000000000000000000	11.6 11.8 12.6 10.2	187 111 350 200 232 175 145	12 27 27 27 27 27 27 27 27 27 27 27 27 27	



Survey (In.) May 1 Past Records May 1 Past Records May 1 Past Records May 1 Start Record Start Start Record Start	
27 45.6 19.7 26.3 12.1 9.2 214 17 21.6 6.2 6.1 1.9 7.6 7.8 80 6.1 22.6 6.2 11.9 7.6 7.8 80 6.1 22.6 6.2 11.9 7.6 7.8 80 14.9 126 7 29 41.4 14.8 9.9 8.3 180 14 30 80.0 30.2 25.3 17.7 11.2 14.7 11.2 14.7 11.2 14.7 11.2 14.7 172 3 3 56.0 11.6 11.6 11.8 1.6 6.9 165 11.8 3 3 56.0 11.6 11.8 11.8 1.6 6.9 165 11.8 11.8 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	No. Elev.
1 21.6 6.2 6.1 3.6 4.9 126 7 1 21.6 6.2 11.9 7.6 7.8 80 6 1 21.6 6.2 11.9 7.6 7.8 80 14 29 41.4 14.8 9.9 8.3 180 14 30 80.0 30.2 33.4 22.4 22.7 133 16 30 59.0 25.3 17.7 11.2 14.7 172 3 3 56.0 11.5 10.6 3.9 8.7 11.8 3 3 56.0 11.5 10.6 3.9 8.7 11.8 3 3 56.0 10.3 7.8 0.0 6.0 172 3 1 30.0 10.3 30.3 21.3 80.0 172 3 1 55.2 8.9 14.2 7.8 8.0 90 88 1 73.0 25.9 14.2 7.8 8.0 90 126 2 25.2 8.9 14.2 7.8 8.0 90 88 1 73.0 25.0 11.1 0.0 1.8 225 8.0 90 2 10.0 10.0 10.0 3.0 234 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.	(Continued)
30 80.0 30.2 33.4 22.4 22.7 133 16 30 59.0 25.3 17.7 11.2 14.7 172 3 3 56.0 18.5 17.5 11.1 15.7 118 3 3 36.0 11.4 11.2 1.6 6.9 165 11 1 30.0 10.3 7.8 0.0 6.0 172 3 6 55.3 25.8 30.3 21.3 25.8 100 3 1 73.0 25.9 14.2 7.8 8.4 106 7 2 8.9 14.6 7.2 9.9 5.2 8.0 90 8 6 No Snow 10.4 29.5 33.2 34.4 120 3 1 70.0 28.3 27.6	



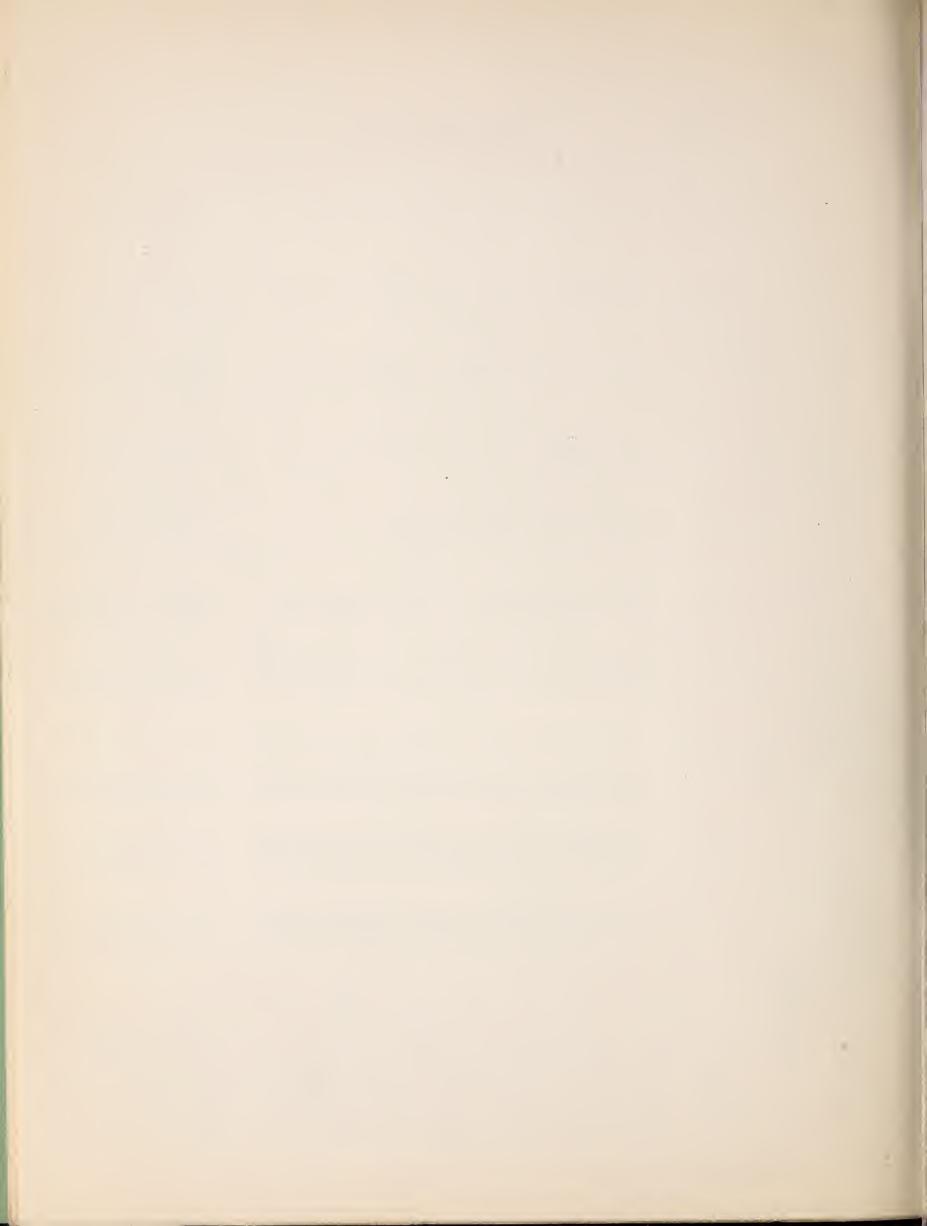
		Ground	Condition						G	round	l Su	ırfac	e N	ot Fr	ozen			
		Years	Record	12	15	27 C	7	i i i i i i i i i i i i i i i i i i i	16	, 귀 그		der grunden mit den men der er eine mit	and an experimental experimenta		and the second s		15	
		e Data		H	16	86	777		125	2777		demanter d'Alexandrica (n. n. n	See Andrews	• TOTAL B. JANGS, gardigatorial gentless • TOTAL B. JANGS, gardigatorial gentless		n en ek en være en skalade flor velkeskalade en e	76	
	Inches)	Average	Avgo		13.8	2,00	T) • 4		0 0	\0, w \0, w			allean anger an a format				5.2	-
	Content (Records	1949	11,50	13.0	1,00	7,00	na stalio cest devanente i regginica i	L L	2.3	winds callfilled all 1000 months	the Starnetskin and Markets and Startest Startes	novinkomo avido (annon annatholista etholista sahri a	all-using death to paid (10 unables)	. D vojakla spega svolusovik	0.0	
	Water C	Dast B	1		23,3	1,00	72.0	glang schlare Volglicher Adel komme	8,5	7.00	mandomics by spec	m sporper des automob	no deserva securios.	em kannolikan onunkanan oluntori			6,0%	
		L vell	1951	13.5	12,5	asured 5.0	74.0%		0 0	5.00					To I delete de serie Marie	management of the Control of the Con	7.4	
	Snow	Depth (Tr.)	1951	11,5	40,5	Not mea	45°C		19.5	27.0							33.5	
	Date	of	1951	Apr. 26		Apr. 26	Apr. 20		Apr. 30	May 1 Apr. 29							May 2 May 1	
			Elev.	9500	9000	9000 8500	0006	8000	8300	8800		7000) -	7900	0006	8500	9700	8200
			No	862	8G4	8G4	500	(Wyoming) 9F8	7E3	7E1 9E7		1056		7554 7552	7E5	7E8	7E7 6F1	7至6
MISSOURI BASIN		DRAINAGE BASIN	SNOW COURSE **	POPO AGIE RIVER	Grannier, Meadows	Larsen Creek Sawmill Glade	South Pass	BEAVERS Will Caron Caron Caron Caron	Tensleep R. S. Timber Greek	Ranger Creek Wood River	SHOSHONE RIVER	East Entrance Svlvan Pass		TONGUE RIVER Burgess Junction Big Goose	Dome Lake	POWDER RIVER North Powder	Muddy Pass Sour Dough	Soldier Park



		Ground	Suriace	Condition				u	∋ Z()J.	H =	tol	1 I	out	noj	īĐ				
		rs	TO	Record (15	 E	∞ .		러.	LΛ-	7	7.	777	ΓV.	<u>Γ</u>	13	7	
		Average Data	-4	%AVE.			101	125	346	72	000	98	76	747	130	0	8	110	112	-
	(Inches)	Averag	May	Avgo			0°07	35,55	200	2°3		15,8	21,0	13.0	15,2	3°7	7.0	34.8	11.5	
	Water Content (Inches)		ecords	1949	ANA		51,1	36°7	9	0	36	11,7	18.4	10.2	16,3	0.0	0.2	70°5	7.9	
	Water		Past Records	1950	DRAINAGE IN MONTANA		68,1	53.7	17,2	707		18.9	24.5	16.7	31.1	e	- 0	55°8	9	,
			May 1	1951	HAINAGE		4°04	44.4	8,6	2.1	11,1	13.6	19.7	19.1	19.9	WC	3,1	38°7	12.9	
	Snow	Depth	(In.)	1951			1°96	112.5	34.6	7,	26.0	25,8	53,5	144.0	58.9	No Snow	6.2	81,0	35.6	
	Date	of	Survey	1951	COLUMBIA RIVER		May 2	May 1	May 1	Apr. 30			Apr. 28				Apr. 29	Apr. 30	May 1	
			Eleve	And the state of t			9009	9800	2000	3500	1700	3000	5100	5000	0009	3500	1,500	7,800	2100	0071
			No	фуддаліся на 4 файдуралістуру да дання 40 автуствення ученавач			15B1	1/A1	14AL	Canada	Canada	Canada	Canada	Canada	15A1	Canada	Canada	16A1	Canada	Canada
MISSOURI BASIN		DRAINAGE BASIN	AND	SNOW COURSE **		KOOTENAT	Baree Mountain	Blue Bird Basin	Brush Creek	Fernie	New Fernie	Ferguson	Gray Creek	Marble Canyon	Red Mountain Mont.	Sandon	Sinclair Pass	Smith Greek	Sullivan Mine	Upper Elk River



Communication and the contributions and		Ground Surface	Condition						uə	zoj	J (101	מ	un	O.J.	n												
-		S. S.	ပိ								<u></u>				*****							d Alphidos aproxim	madestale lays, success		y religions (like		aramen - s	
		Years of	Record	(Λα	o ~	H	10 	13	17	դ Ն		. ~	~	\sim	~	~	-	- 1	Н	91	7	27 7	7	191	α -	- (n
		ge Data	%Avg.	ľ	00T	190	150	06 1	8	214	777	108		101	80	(20)	0	8	-	0	787	121	350	000	232	8		3
	(Inches)	Average May	Avge	- 1	47.4	16.7	6°6	27.1	1.8	9.5	0000	20°4		47.3	41.2	70	9	İ	9	B D D D D D D D D D D D D D D D D D D D	<u> </u>	35.8	000 - 100	ł (10 20 20 20			/ CT0 /
	Content	Records	1949		7.077	21.5	10.8	26.7	3.4	12.1) E-	17.0	0	35.4	36.5	0	Û	0	9	0	0,0		o i E	7,3	0,0	000	1	10.5
	Water (1 1		00°C	13.6	21.7	37°4 29°0	7.7	26.3	0.00	28.0	18.1	58°8	53.1			1		ap romandot iliteratura	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	59.6	70,01	7001	8,9	37.2	1	2%0
		May 1	1951	0	٦ ، ۵ ۷ «	31.7	14.8	24.0 40.3	1,0	19.7	47°C4	2	6.8	47.9	32.9	ν, ν,	33.5	ر د ا	↑°T	-	0,5	43.4	0		9 9	27.2	0	0
	Snow	Depth (In.)	1951	6	118°1	24°0 74°6	36.0	54°8 114°0	3.4	145.6	Ċ	57.0	15,3	73.0	81,6	16.7	72.0	11.3	7.0	10.9 No Snow	6,1/1	91.2	29°0	4	20°7	71.0	000	40°5
	Date	of Survey	1951	4		Apr. 27		Apr. 30 May 3				Apr. 24								Apr. 30 Apr. 28	May 2	May 5	May 2			May 5		May >
		Elev.						5700 A 7600 N												3580 A	00 69		(200 A		6250 N			007)
		Noe			1383	13A1	13A2	1443 13B8	114A5	13A5	1256	13A9	13B2	13B10	13B1	13A12	13B5	13B14	13B13	13A13 13B11	1265	13B7	12D1	1367	1202	1309	αυς r	コンペロ
COLUMBIA RIVER BASIN		DRAINAGE BASIN AND	SNOW COURSE **	FLATHEAD RIVER	Big Creek	Brusn Creek Cattle Queen	Desert Mountain	Hell Roaring Divide Limestone Pass	Logan Creek	Marias Pass	Reing Lake	Snow Lab. #16	Spotted Bear Mt.	Strawberry Lake	Trinkus Lake	Lake #2	Upper Holland Lake	Basin Creek	Holbrook	Quintonkon Twin Creeks	UPPER CLARK FORK Chessman Res.	North Fork Jocko	ripestone rass Rainv Lake	Stemple Pass	Tenmile, Lower	El Dorado Mine	Good Lass	מסדת חדמנים

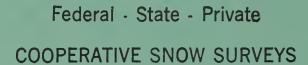


MONTANA SNOW SURVEYS, MAY 1, 1951

COLUMBIA RIVER BASIN											
			Date	Snow		Water Content	ntent ((Inches)			
DRAINAGE BASIN			of	Depth	The second state of the se	distance of the state of the st		Average Data	Data	Years	Ground
AND	No.	Elevo	Survey	(In,)	May 1	Past Records	scords	May 1	~	ę, (Surface
SNOW COURSE **			1951	1951	1951	1950	1949	Avgo	%Avg.	Record	Condition
UPPER CLARK FORK (Continued)	tinued)						·				
Tenmile, Upper	1203	6800	May 4	70.97	14.8	18.8	7.07	10,2	145	16	τ
*Lookout	15B2	5250	May 1	0.79	27.5	45.1	36.6	33.0	 89	13	ıəz
						**************************************	e de la constante de la consta				οJ
PEND OREILLE						ne domin		delade			. Т
Baree Mt.	13B1	0009	May 2	96°h	4004	68,1	51,1	0.04	101	H	40
*Mosquito Ridge	16A4	2600	May 2	65.0	26.8	147	34.1	28,1	95	13	N
			5						· · · · · · · · · · · · · · · · · · ·		pı
BITTERROOT						entere and					mo
Gibbons Pass	1302	7100	May 1	60,5	23.6	28,3	22.9	19°7	122	16	νĮ
) }	i) }		•	hatic		<u> </u>			Ð
* Adjacent Basin									de		







Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"WATER IS THE WEST'S GREATEST RESOURCE"